BRUSHY CREEK BRIDGE
Texas Historic Bridges Recording Project
Spanning Brushy Creek at County Route 398
Thorndale Vicinity
Milam County
Texas

HAER No. TX-59

BLACK AND WHITE PHOTOGRAPHY

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
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BRUSHY CREEK BRIDGE

HAER No. TX-59

Location:	Spanning Brushy Creek at County Route 398, Thorndale vicinity, Milam County, Texas. UTM: 14/673670/3387060 USGS: Thorndale, Texas, quadrangle (1989).
Date of Construction:	1911.
Designer:	Chicago Bridge and Iron Company, Chicago, Illinois.
Builder:	C. Q. Horton, Austin, Texas, agent for Chicago Bridge and Iron Company.
Present Owner:	Milam County.
Present Use:	Vehicular bridge.
Significance:	The Brushy Creek Bridge is a surviving example of a standard highway bridge used in the late nineteenth and early twentieth century. It is a late example of pin-connected construction and is one of five remaining bridges employing a pin-connected Pratt through truss in Milam County.
Historian:	Estella M. Chung, August 1996. Revised September 1998.
Project Information:	This document was prepared as a part of the Texas Historic Bridges Recording Project performed during the summer of 1996 by the Historic American Engineering Record (HAER). The project was sponsored by the Texas Department of Transportation (TxDOT).

Introduction

Builder's plates on the Brushy Creek Bridge identify C. Q. Horton of Austin, Texas, as its builder, and list the Milam County judge and commissioners. Horton, an agent for the prolific Chicago Bridge and Iron Company, developed a healthy business relationship with Milam County. He constructed four bridges for the agriculture-based county (see Appendix A).[1] "Since Milam County contains so many waterways, bridges and ferries were conveniences if not downright necessities," stated Lelia N. Batte, author of a *History of Milam County, Texas.*[2] The transportation system was a priority for the citizens of Cameron, the county seat, who were mandated to participate in road construction and maintenance. When the Brushy Creek Bridge was built, roads were becoming more important to the farm economy. Farmers in Milam County discovered farm machinery, produced crops above subsistence level, and needed better roads to transport their goods to market.[3] Located on a local road just south of Thorndale, the Brushy Creek Bridge connected farmers with the Missouri Pacific railroad depot there.

The Chicago Bridge and Iron Company

The economics of fabrication led to the formation of the Chicago Bridge and Iron Company. Without their own fabricating yards, independent bridge builders Horace E. Horton and George E. King could not stay competitive in the bridge building business. They were at the mercy of prices and fabrication delays of their competitors. The Chicago Bridge and Iron Company was created in 1889 when Horton merged with the Kansas City Bridge and Iron Company, which had fabrication facilities. King joined the Chicago Bridge and Iron Company in 1890.[4]

The mergers created a company that could cover a substantial part of the national market. Horton, originally based in Rochester, Minnesota, contributed a sizable portion of the Midwestern market. King, from Des Moines, Iowa, contributed much of the Iowa market. Kansas City Bridge and Iron Company of Rosedale, Kansas, had business established in Kansas,

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[1] Lelia M. Batte, *History of Milam County, Texas* (San Antonio, Texas: Naylor Company, 1956), pp. 103-110. For another of Horton's bridges, see U.S. Department of the Interior, Historic American Engineering Record (HAER) No. TX-60, "Bryant Station Bridge," 1996, Prints and Photographs Division, Library of Congress, Washington, D.C.

[2] Batte, p. 81.

[3] Ibid., pp. 103-10.

[4] *The Bridge Works: A History of the Chicago Bridge & Iron Company* (Chicago: Mobium Press, 1987), pp. 2-9.

Missouri, Nebraska, and most importantly for the Brushy Creek Bridge, the new market of Texas.[5]

The $4,675.00 contract for the Brushy Creek Bridge was awarded to Chicago Bridge and Iron Company agent C. Q. Horton.[6] Horton, based in Austin, was originally the southern agent for the Kansas City Bridge and Iron Company.[7] After the merger, Horton worked as the southern agent for the Chicago Bridge and Iron Company. However, after the financial panic of 1893, Chicago Bridge and Iron Company closed its Austin office.[8] Though Horton had become an independent bridge builder by 1900, he was back with the Chicago Bridge and Iron Company by 1904.[9]

Description

The Brushy Creek Bridge is a 114'-0"-long six-panel Pratt through truss with inclined end posts. Steel stringer approaches bring the total length to 133'-0". The Pratt truss, typically used for spans from 125'-0" to 250'-0", was a common form in the late nineteenth and early twentieth century. Both Howe and Pratt trusses are divided into rectangular panels each crossed by two diagonals. The Pratt truss carries loads with diagonals in tension and verticals in compression; this situation is reversed in the Howe truss. The Pratt truss' verticals, shorter than the diagonals in the Howe truss, are less likely to buckle under compression.[10] The Pratt form was created by

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[5] Ibid.

[6] Milam County, Texas, *Commissioners' Court Minutes,* vol. 4 (Milam County, Texas), p. 625 (November 2, 1910).

[7] *The Bridge Works,* p. 6. Horton is listed as an agent for Kansas City Bridge and Iron Company in *Morrison & Fourmy's General Directory of the City of Austin 1889-1890* (Galveston, Texas: Morrison and Fourmy, 1889).

[8] In *Morrison & Fourmy's General Directory of the City of Austin 1895-1896* (Galveston, Texas: Morrison and Fourmy, 1895), C. Q. Horton is listed as president of the Texas Electric Company and southern agent for the Chicago Bridge and Iron Company. Horton's post in the Texas Electric Company suggests a slowdown in the bridge-building business and his changing relationship with the Chicago Bridge and Iron Company.

[9] *Morrison & Fourmy's General Directory of the City of Austin 1900-1901* (Galveston, Texas: Morrison and Fourmy, 1900). Bridge Manufacturers File, Texas Department of Transportation, Austin, Texas.

[10] David Plowden, *Bridges: The Spans of North America* (New York: Viking Press, 1974), p. 40.

Thomas Pratt, probably around 1842; he and his father Caleb patented it in 1844.[11] Technology historians such as Carl Condit recognized the practicality of the Pratt truss:

> Among truss bridges, the nearly universal reliance on Pratt and Warren trusses has helped to make possible the elegance and precision of form that was once regarded as hopelessly unattainable in such structures. Simplicity has led to a unity of line and surface which has nothing to obscure or interrupt the clarity of the main elements and the naturally pleasing geometric pattern arising from their necessary relations. . . .[12]

Measured from pin to pin, the Brushy Creek Bridge's Pratt truss is 19'-0" high. It carries a 11'-6"-wide one-lane roadway, and is 13'-8" wide overall. Carnegie channels riveted to a continuous top plate and tie plates underneath form the upper chord's rectangular section. Angles bolted to the upper chord form the overhead struts, the panels between which are braced by crossed rods. Portal bracing, consisting of angles riveted together, is bolted to the inclined end posts. Verticals U2-L2, U3-L3, and U4-L4 are pairs of channels connected by riveted single lacing. Because no diagonals are connected to panel points L1 and L5, verticals U1-L1 and U5-L5 act as hangers in tension. The slender looped eye bar verticals at these locations reflect their design for tensile forces only.

The verticals are pin-connected to the diagonals and the lower chord, which consists of double eye bars of rectangular section. U-bolts are looped over each lower-chord pin, each carrying a plate which supports the I-section deck beams. Crossed rods form the lower lateral bracing. Eight I-beam stringers span between the deck beams, carrying a floor of transverse wooden planking. A pair of longitudinal wooden treads form a smooth path for wheels; three stringers are concentrated beneath each.

It was unusual for a bridge to be pin-connected so late as 1911. Pin-connected trusses reached their peak of popularity in the 1880s. They prevailed because they were lightweight, members did not have to be shop-assembled, and required less skilled labor to assemble than a riveted truss. However, loose eye bars and pins were a common problem. On occasion, a failed joints collapsed a bridge. Riveted trusses emerged in the 1870s, and were essential near the turn of the century, when railroad bridges required more stiffness and rigidity. The prevalence of

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[11] Carl W. Condit, *American Building Art: The Nineteenth Century* (New York: Oxford University Press, 1961), p. 110.

[12] Condit, *American Building Art: The Twentieth Century* (New York: Oxford University Press, 1961), p. 302.

riveted spans for both railroad and highway bridges by 1911 makes the Brushy Creek Bridge a late example of the pin-connected type.[13]

Farmers in Milam County, still an agricultural community, use the bridge today much as they did in 1911. From their farms, they cross the bridge to reach the depot at Thorndale and roads to Austin. The Brushy Creek Bridge is a late example of pin-connected construction, one of five remaining bridges employing a pin-connected Pratt through truss in Milam County, and one of eighty-three bridges employing a pin-connected Pratt through truss in Texas.

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[13] Llewellyn Nathaniel Edwards, *A Record of History and Evolution of Early American Bridges* (Orono, Maine: University Press, 1959), pp. 104-05, 114-17.

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APPENDIX A: Bridges Built in Milam County, Texas, by C. Q. Horton

Year	Bridge Name	Spanning	Road Carried
1909	Bryant Station Bridge	Little River	County Route 275
1911	Donahue Creek	Donahue Creek	County Route 278
1911	Brushy Creek	Brushy Creek	County Route 398
1913	San Gabriel River	San Gabriel River	County Route 355

APPENDIX B: Sketch Plan and Elevation of Brushy Creek Bridge